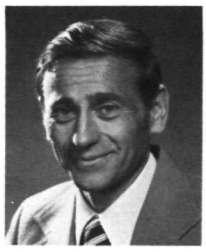
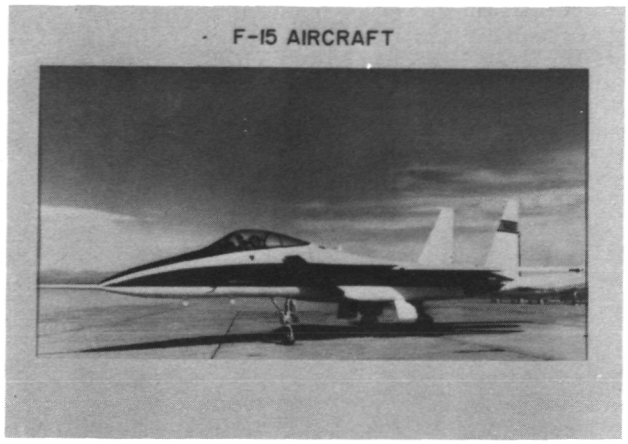
D14

XIV. HIGH PERFORMANCE VEHICLE TECHNOLOGY

Louis A. Povinelli



LOUIS A. POVINELLI joined the NASA Lewis staff in 1960 after a year of postdoctoral research at the Polytechnic Institute of Turin. He obtained a Ph.D. degree in engineering from Northwestern University, an M.S. degree from the University of Kentucky, and a B.S. degree from the University of Detroit. At Lewis, he has specialized in teaching compressible flow and in research on turbofan mixers and diffusers, rocket and turbojet combustion, and hypersonic propulsion. He has served as Associate Editor of the AIAA Journal and Chairman of the AIAA Propellants and Combustion Technology Committee.



HIGH PERFORMANCE VEHICLE TECHNOLOGY

INLET PERFORMANCE

NOZZLE PERFORMANCE & COOLING

AFTERBURNER PERFORMANCE

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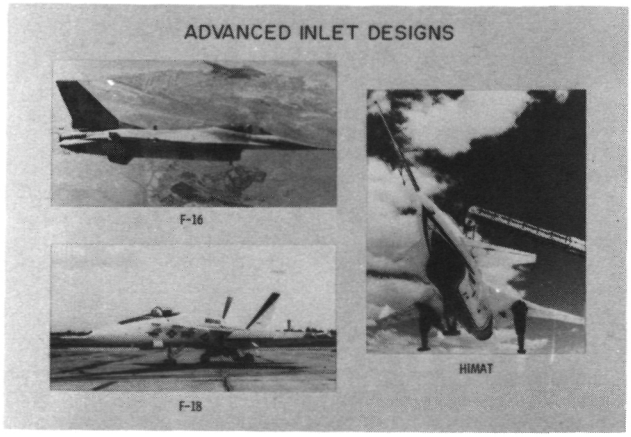

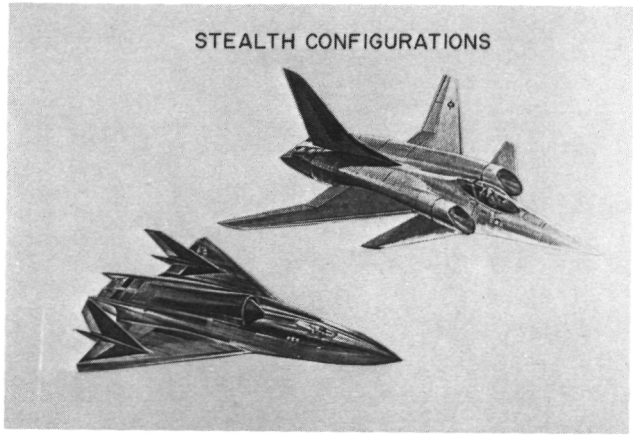

GEOMETRICAL AND OPERATIONAL REQUIREMENTS FOR INLETS

HIGH DEGREE OF INTEGRATION WITH AIRFRAME

SIMPLE, LIGHTWEIGHT DESIGN, SHORT LENGTHS, LARGE OFFSET, GEOMETRIC TRANSITION

WIDE MACH NO. & ANGLE OF ATTACK CAPABILITY

STALL & BUZZ FREE OPERATION

LOW RADAR CROSS SECTION

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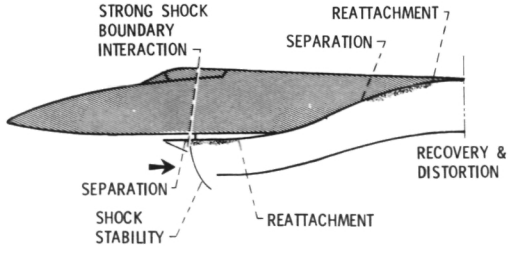
AERODYNAMIC FEATURES OF ADVANCED INLETS



BOUNDARY LAYER CONTROL TECHNIQUES
VORTEX GENERATORS
BLEEDING
BLOWING

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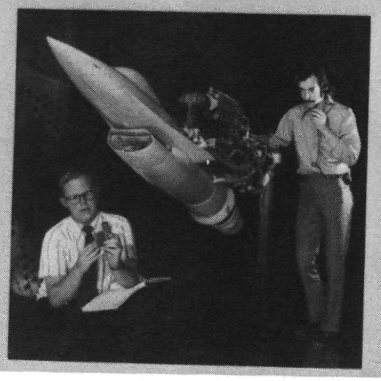
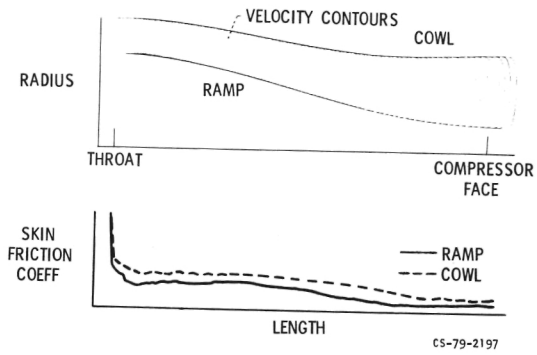
F-16 INLET MODEL TESTING IN LEWIS 8X6 TUNNEL



COMPUTER ANALYSIS OF F-16 INLET



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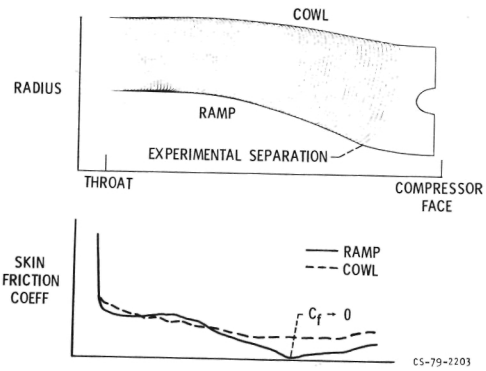
HiMAT INLET TEST IN 8X6 TUNNEL

COMPUTER ANALYSIS OF HiMAT INLET



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GEOMETRICAL AND OPERATIONAL REQUIREMENTS FOR NOZZLES

HIGH DEGREE OF INTEGRATION WITH AIRFRAME

STEALTH CONSIDERATIONS

THRUST DEFLECTION & REVERSING

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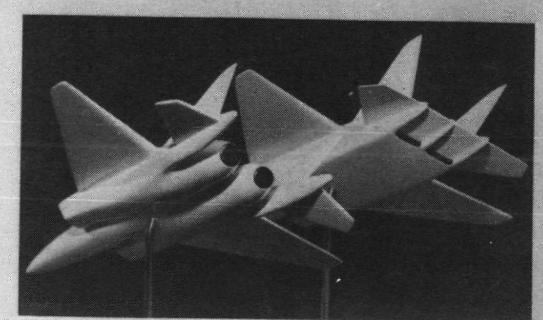
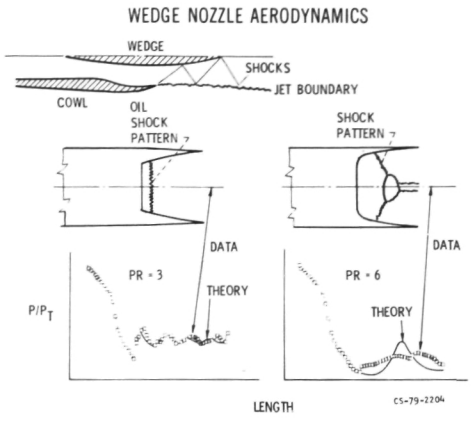
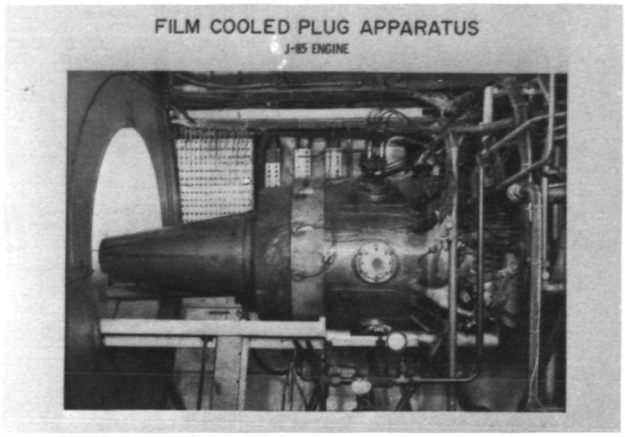
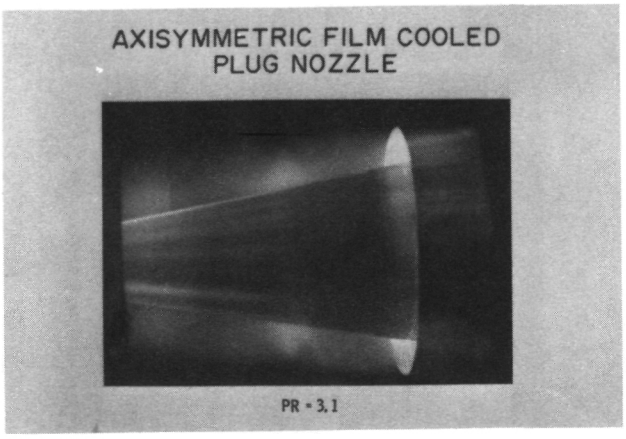
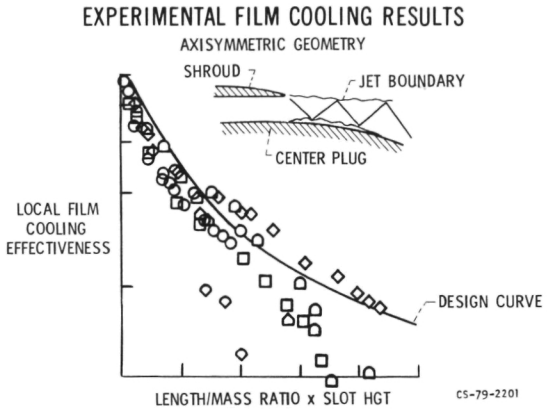
TWIN AXISYMMETRIC AND WEDGE NOZZLE INSTALLATION

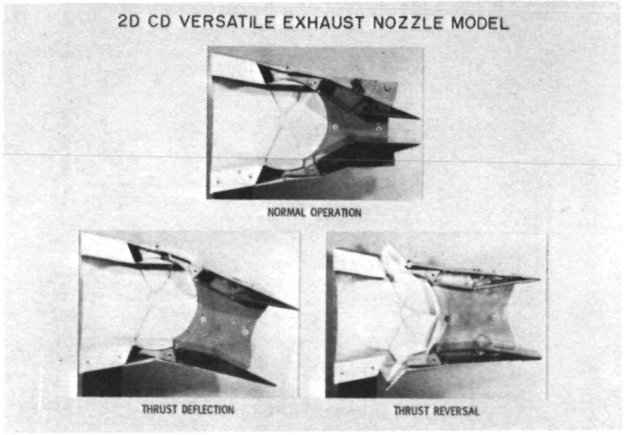












AFTERBURNER IMPROVEMENT GOALS

INCREASE ALTITUDE LIMIT FOR STABLE COMBUSTION WITHOUT RUMBLE

INCREASE BLOWOUT LIMIT FOR IDLE TO MAX AUGMENTATION THROTTLE TRANSIENTS

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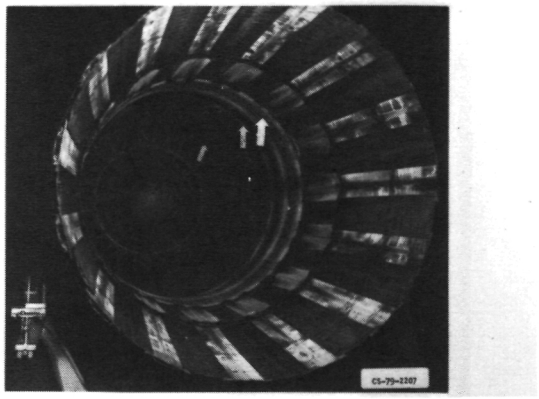
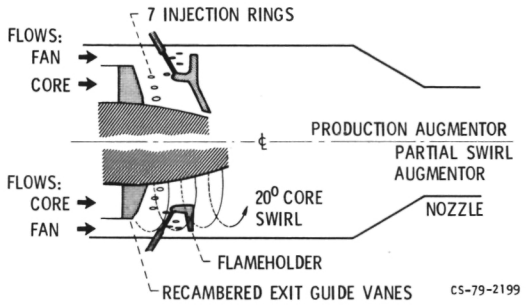
AFTERBURNER VIEW OF F-106 ENGINE



SWIRL AND PRODUCTION AUGMENTOR COMPARISON



EFFECT OF SWIRL ON AFTERBURNER